

REMARKS

A Request For A One Month Extension Of Time is submitted herewith, along with the required extension fee of \$55.00.

In the Office Action, the examiner allowed claims 4-23 and rejected claims 1-3 and 24-27 as anticipated under 35 U.S.C. 102(b) by the Roye reference. The rejection is traversed, and reconsideration is respectfully requested.

Claims 1-3 and 24-27 have been amended to clarify:

(1) that the objects of the scanned document are either (A) objects which represent essential information (i.e., data objects), or (B) undesired objects (i.e., noise objects) such as undesired marks, blotches etc., that represent “noise”;

(2) an object grabbing (i.e., object building) operation is performed on runlength data resulting from the scanning of the document to build all of the objects of the document (including “data objects” and “noise objects”) from the runlength data; note that this object building procedure is not novel, and can be exactly the same as disclosed in the Roye reference;

(3) that the objects which represent essential information are marked as data objects; the remaining objects necessarily are noise objects; and

(4) that the reconstructed document consists of the marked data objects and therefore excludes the noise objects; that is, the invention omits undesired visible objects (composed of dark pixels) present on the scanned document from the reconstructed replica thereof.

Rejected claim 1 has now been amended so that each of steps (a), (b) and (c) clearly distinguish over the Roye reference.

Step (a) of claim 1 recites that all of the objects of the document are either objects which represent essential information (data objects) or objects which represent undesired noise (noise objects).

The term “object” is described in the specification as being built from slices in the runlength data obtained by scanning a dark (visible) image on the document. The term “slice” is described as a group of adjacent dark pixels in the same raster scan line. An object therefore is composed of dark pixels. The term “noise” is described as an undesired object. A noise object therefore also is composed of dark pixels. “Data objects” result from scanning of desired or essential corresponding dark visible images, marks, etc., on the scanned document. “Noise objects” result from scanning of undesired blotches, marks, etc., on the scanned document. Gaps within objects are composed of transparent pixels, which are pixels that are not dark pixels. A gap within an object is not an object because the gap is not composed of dark pixels.

Exhibit A is submitted herewith to illustrate several examples of objects built using the method disclosed in the Roye reference, and also to help explain what is done with the objects after they are built, both according to the Roye reference and according to the present invention. Referring to Exhibit A, the object 1 illustrated is built from a number of overlapping slices 3-1, 3-3, 3-4 etc., which are composed of dark pixels. Reference numerals 5 and 6 denote horizontal gaps (composed of transparent pixels) in the same raster scan line located within object 1. Reference numeral 8 denotes a vertical gap composed of vertically aligned transparent pixels between slices on adjacent raster scan lines. (This should also answer the examiner's query in the fourth paragraph of page 3 of the office action.)

According to the Roye disclosure, object 1 is not "marked", or even recognized, as either a data object or as a noise object after it is built. However, if the gaps composed of adjacent transparent pixels located within object 1 are small enough to be insignificant, they are eliminated by "filling them in", i.e., by replacing them with dark pixels, to thereby produce the object 1A shown in Exhibit A. In either case, all of the objects built from runlength data produced by scanning of the original document, including objects which represent the desired images in the originally scanned document and also including undesired marks, blotches, etc., on the originally scanned document, are used to produce an efficient digital representation of the originally scanned document. Thus, in the Roye reference, undesired blotches, marks etc., of the original document are not eliminated in the document reconstructed from the objects built, and instead are actually reproduced in the reconstructed replica of the original document. The undesired blotches are merely digitally represented more efficiently than in the runlength data

obtained by scanning the original document, but they are not eliminated from the reconstructed document. Nothing in the Roye reference suggests that noise objects (which are composed of dark pixels) representing undesired blotches, etc., should be eliminated from the reconstructed replica of the originally scanned document.

In contrast, in the present invention every object built from slices of the runlength data obtained by scanning the original document is evaluated according to a set of rules to determine whether that object is a “data object” representing a desired image of the originally scanned document or is a “noise object” representing an undesired blotch, mark, etc., of the originally scanned document. (If an object is not a “data object”, then it necessarily is a “noise object”.) The data objects all are marked, and only the marked data objects are used to reconstruct the originally scanned document. Consequently, the undesired blotches, marks, etc., are omitted from the reconstructed version of the originally scanned document, in sharp contrast to the Roye disclosure in which all desired objects and also all undesired objects present in the originally scanned document are reproduced in the reconstructed replica of the originally scanned document. (In the described embodiments of the present invention, no object is modified, i.e. by filling in gaps within an object.)

In Exhibit A, object 10 is an example of an object that according to the present invention would be likely to be determined to be a “data object”. The object can consist of a circular arrangement of overlapping slices obtained from the runlength data produced by scanning the original document, and could represent a “period” or a dot.

According to the present invention, the object 1 in Exhibit A might be determined to be a “noise object”, for example if the gaps are sufficiently large or irregular, or if the overall shape of object 1 is not recognized as a “data object” according to the analysis rules being used. In direct opposition to the teachings of the Roye reference, the object 1 is not included in the reconstruction the originally scanned document. Therefore, in accordance with the present invention (and in direct opposition to the Roye reference), the corresponding undesired blotch or mark visible on the original document is **eliminated** from the reconstructed version of the original document. The Roye reference does not disclose or suggest identifying or marking any of the built objects as either essential objects (i.e., data objects) or as noise objects, and in fact does not even involve recognizing that any of the built objects are either “data objects” or “noise objects”. (In the described embodiments of present invention, object 1 is not modified by filling in any gaps that may be present within it.)

Step (b) of claim 1 recites that objects which represent essential information of the document are marked as data objects, and also recites that the remaining objects are noise objects. The objects which are not marked as essential objects necessarily are noise objects. (In one described embodiment, all objects are initially considered to be noise, and then some of them are marked as essential objects.) In contrast, the Roye reference modifies some of the objects by filling in gaps by replacing transparent pixels with dark pixels, but this is entirely different than identifying an object (which is composed of dark pixels) as a particular type of object (i.e., as a “data object” or a “noise object”). The Roye reference does not disclose or suggest marking (or even recognizing) any object as either a data object or as a noise object. Nor is there any need in

the Roye reference to mark any object as a data object or a noise object because Roye uses every object to reconstruct the originally scanned document, irrespective of whether the objects represent data or noise.

It is respectfully submitted that this is a fundamental difference between the present invention and anything disclosed or suggested in the Roye reference.

Step (c) of claim 1 recites that the originally scanned document is reconstructed to consist of all of the “marked” objects (i.e., all of the “data objects”), and emphasizes this point by also reciting that the noise objects are thereby excluded from the reconstructed document. In contrast, the Roye reference discloses reconstructing the document to include all of the objects built by the object grabbing operation, including the objects that represent undesired blotches, etc., (i.e., noise objects). In the Roye reference, none of the objects are marked, nor is there any reason to mark them, and the Roye reference does not disclose or suggest excluding any of the undesired blotches, (i.e., noise objects composed of dark pixels) etc., from the reconstructed document.

To summarize, the Roye reference discloses operating individually on each object to determine if it includes minute gaps, which by definition are composed of adjacent “transparent” pixels (i.e., pixels which are not dark pixels and therefore are not visible as marks on the document). The Roye reference discloses filling in such minute gaps with dark pixels in order to eliminate the minute gaps. The minute gaps are located within objects and clearly are not themselves objects because they are not composed of dark, visible pixels. The minute gaps, not

being objects, are incapable of being recognized or identified as objects. Therefore, the minute gaps composed of transparent pixels are entirely dissimilar to the noise objects (which are built of dark pixels) recited in amended claim 1.

In contrast to the Roye reference, in the present invention as defined in claim 1, only marked data objects are used to reconstruct the originally scanned document, whereas in the Roye reference all of the objects (none of which is marked or recognized as a data object) are used in reconstructing the originally scanned document. This is in direct opposition to the Roye reference, wherein only minute gaps within objects are eliminated, but none of the objects themselves are ever eliminated, regardless of whether they are data objects or noise objects. In the Roye reference, all of the objects, including noise objects, are included in the reconstructed document, and therefore undesired blotches etc., on the originally scanned document are reproduced in the reconstructed replica thereof. No objects, no matter how undesirable, are omitted in reconstruction of the originally scanned document. This is fundamentally different than reconstructing the originally scanned document to include only the data objects (and to thereby omit all of the noise objects), as recited in the amended claims.

The examiner has stated that a single slice in the Roye reference can be broadly interpreted as an object for purposes of reading the Roye reference on the claims. However, the foregoing arguments clearly distinguish steps (b) and (c) of claim 1 over the Roye reference irrespective of whether an object consists of multiple slices or just a single slice, because the Roye reference does not mark any object as a data object, and also

because the Roye reference uses all objects, irrespective of whether they are data objects or noise objects, to reconstruct the originally scanned document, and thereby reproduces all objectionable noise images that are visible on the originally scanned document back into the reconstructed version of the originally scanned document.

The foregoing amendments clarify what was implicit in original claims 1-3 and 24-27, and the foregoing arguments are also applicable to amended claims 2,3, and 24-27.

Referring next to the examiner's comments, in section 2 on page 2 of the present Office Action, the examiner commented on the Roye reference's disclosure of processing of runlength data, stating "In this processing of image runlength data, a set of "slices" is generated and an object-grabbing operation is performed on this set (col. 2, lines 41-52)". This comment by the examiner pertains to step (a) of amended claim 1, which as explained above is the same as the object building operation disclosed in the Roye reference.

The examiner then states "...trivial gaps ("noise images") are separated from significant information ("essential images"), the significant information is marked for retention while the trivial gaps are discarded". This statement by the examiner pertains to step (b) of claim 1, but is inconsistent with the Roye reference, because the minute gaps disclosed in the Roye reference are composed of transparent pixels, and are all located within objects that are composed of dark pixels, and therefore clearly are not "noise objects" as disclosed and claimed in the present application. Replacing transparent pixels of the gap within an object is really a "repairing" of that

object, not a discarding of the object. The Roye reference never labels or marks or discards any object composed of dark pixels, regardless of whether it represents an undesirable blotch, etc., or a desired image composed of dark pixels; instead, Roye uses all objects (irrespective of whether they have been “repaired” by filling in gaps) to reconstruct the replica of the originally scanned document, and therefore reproduces all undesirable blotches etc., in the reconstructed replica.

The foregoing statement by the examiner also is inconsistent with the Roye reference because the gaps disclosed in the Roye reference are never separated from significant information or essential images. Instead, the transparent minute gaps disclosed in the Roye reference are always contained within a visible object composed of dark pixels, and the transparent gaps are filled in with dark pixels so that the gaps within the object no longer exist, i.e., are “repaired”. In the Roye reference, the object is never recognized or marked as a data object or noise object and is never discarded or eliminated from use in reconstructing the replica of the originally scanned document. The gaps, which are always inside of a visible object composed of dark pixels, clearly are not separate objects themselves, and they clearly are never separated from the objects within which they are located. None of the objects in the Roye reference are ever designated or recognized as noise images or noise objects or data objects or eliminated from inclusion in the reconstructed replica of the original document.

The examiner also states that the Roye reference discloses that “...a reduced noise version of the image is reconstructed containing only the former [i.e., containing only the significant information]”. This statement by the examiner refers to step (c) of claim 1. However, as

explained above, the Roye reference discloses reconstructing the scanned document from all of the objects. None of the objects are omitted in reconstructing the document in the Roye reference, and specifically, noise objects are not omitted in reconstructing the scanned document, and dark blotches, etc., on the originally scanned document are reproduced in the reconstructed replica of the original document. Only gaps within objects are omitted in Roye, but the objects themselves are never omitted from the reconstructed replica of the originally scanned document. This is in sharp contrast to the present invention, wherein all noise objects are omitted from the reconstructed document, because reconstructed document consists only of the “the marked data objects”.

On page 3 of the present Office Action, the examiner refers to the applicants’ earlier argument in response to the final Office Action of 05/14/2003, to the effect that the gaps which are “filled in” in the Roye reference refer to the “absence of dark pixels between adjacent slices and therefore cannot constitute any type of image or noise image”, and then states “However, it is unclear how the absence of [dark] pixels can produce a horizontal or vertical gap (Roye, col. 2, line 66-col. 3, line for) within a set of image data”. [Bracketed material added.]

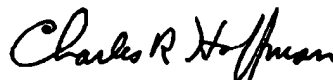
For the examiner’s information, the absence of dark pixels in a region between two objects (which are built from visible dark pixels) by definition constitutes a gap consisting of transparent pixels. The foregoing discussion of Exhibit A shows how horizontal gaps and vertical gaps are formed in an object by the absence of dark pixels where the gaps are located.

In the advisory action dated 07/21/2003, the examiner refused to enter the applicants' amendment after final rejection, noting that the applicants' amendment to the effect that the recited object grabbing operation is performed on "slices included in runlength data" of the digital representation raised a new issue as to whether each of the "slices" represents a grabbed "object" or whether "the set of slices" is processed to grab one or more "objects" from their contents"; the examiner also noted that the applicants argument in the response to the final office action rests on the latter interpretation. It is respectfully submitted that the above amendments to the rejected claims and the above explanation of what "data objects" and "noise objects" are into the differences between how the data objects and the noise objects are used in the present invention and how they are used in the Roye reference shows that there really is no longer any issue with regard to this matter.

In view of the above arguments and amendments, it is respectfully submitted that the amended claims are not disclosed or suggested by the Roye reference. Therefore, the application now is believed to be in condition for allowance.

Respectfully submitted,

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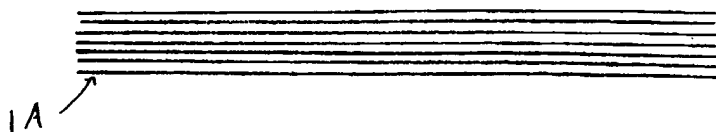
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EXHIBIT A

ROYE:



PRESENT INVENTION:



1. SOME OBJECTS ARE MODIFIED BY FILLING GAPS (TRANSPARENT PIXELS) WITH DARK PIXELS
2. ALL OBJECTS ARE USED TO RECONSTRUCT THE SCANNED DOCUMENT

(NO OBJECTS ARE MARKED AS DATA OBJECTS OR NOISE OBJECTS)

1. NO OBJECTS ARE MODIFIED
2. ALL OBJECTS ARE ANALYZED TO DETERMINE IF THEY ARE DATA OBJECTS OR NOISE OBJECTS & DATA OBJECTS ARE MARKED
3. ONLY DATA OBJECTS ARE USED TO RECONSTRUCT THE SCANNED DOCUMENT